2018 ANNUAL WEATHER SUMMARY
FOR THE CENTRAL CALIFORNIA INTERIOR

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Monthly Recap of Temperature and Precipitation Patterns during 2018:

January - Much above average temperatures with below average precipitation. 4th warmest January on record for Bakersfield and 3rd warmest for Fresno.

February – Near to below average temperatures and much below average precipitation.

March – Near to below average temperatures and much above average precipitation.

April - Above average temperatures with near to below average precipitation, except for above average precipitation in the Sierra Nevada in Mariposa and Madera Counties, as well as much of Merced County.

May - Near average temperatures with below average precipitation.

June – Near to above average temperatures with little to no precipitation.

July - Warmest July and calendar month on record for quite a few locations. Fresno had its warmest month on record, while Bakersfield had its second warmest month on record. Below average rainfall occurred, except in the higher elevations of the Sierra Nevada due to thunderstorm activity.

August - Warmer than average with little or no rain, except near to below average temperatures in Merced County and western Fresno County.

September – Variable temperatures with below to near average precipitation. No precipitation occurred in the San Joaquin Valley; however, parts of the southern Sierra Nevada reported brief heavy rain from thunderstorms during the 4th). Near to below average temperatures occurred in Merced County and western Fresno County, but near to above average temperatures prevailed elsewhere.

October - Warmer than average with variable precipitation. Heavy rain from scattered thunderstorms fell during the 2nd-4th, with the heaviest amounts in the Sierra Nevada.

November - Warmer than average with above average precipitation. Precipitation occurred mainly after the 20th of the month.

December - Warmer than average with below to near average precipitation.

Overall, the year was much warmer than average in terms of annual average temperature, except near average in Merced County (Fig 1). In terms of how warm it was this year, Fresno had its 2nd warmest year on record, while Bakersfield reached 3rd warmest. The last five consecutive years (2014-2018) are now the warmest years on record at both locations. During 2018, below to near average precipitation fell in locations throughout the region (Fig 2).

Highlights and Significant Weather Events during 2018 (Bakersfield, Fresno, Hanford, Madera, and Merced):

January 1-3: Poor air quality and stagnant air due to strong high pressure persisted.

January 8-9: A significant storm system brought abundant rain; several inches of mountain snow mainly above 8,000 feet. Snow amounts were relatively light, or up to 6 inches; however, rainfall amounts were quite heavy. Around one to three inches of rain fell in the San Joaquin Valley and much of the Sierra Nevada, as well as the Kern County mountains. A strong wind gust from the south produced gusts to 60 mph at the base of the Grapevine and 94 mph over the nearby Grapevine Peak above Interstate 5.

February 7: A strong ridge of high pressure brought warm daytime high temperatures. Highs reached into the upper 70s and lower 80s in the San Joaquin Valley. Record highs were set at Bakersfield with a high of 81 degrees, while Fresno had a high of 79 degrees.

February 20-25: A very cold airmass that originated from the Arctic region brought periods of freezing nighttime and morning temperatures to much of the San Joaquin Valley that caused millions of dollars in crop damage.

March 20-22: A series of atmospheric rivers brought rain and mountain snow to much of Central California, and rain was heavy at times, even in the San Joaquin Valley. About ½ inch of rain fell in less than an hour in Bakersfield on the 20th, and a similar amount occurred in Fresno on the 21st. This amount of rain in this short period of time was enough to cause localized street flooding in these cities. During the last day of the period, flash flooding and severe weather occurred in parts of Central California. Flash flooding washed out some buildings in Mariposa during the early afternoon. In the late afternoon hours a brief weak tornado touched down about 10 miles north of Visalia.

April 6-7: A heavy rain event brought around two to three inches of rain in the Sierra Nevada and foothills at elevations up to 8,000 feet and caused river flooding in Yosemite Valley that resulted in a closure of Yosemite National Park. The heavy rain combined with rapid snow melt due to previous storms. Heavy rain also fell in Merced County; around 1.00 to 2.00 inches fell.

July 8-August 22: A large wildfire known as the Ferguson Fire burned a significant portion of Mariposa County in the Sierra Nevada, as well as portions of Madera County and Yosemite National Park. Hot temperatures, rough terrain, and dead trees enabled very active fire behavior

during much of this period. The fire burned about 96,000 acres of timber that caused a burn scar that later became flood prone when the first heavy rain fell.

Oct 3: A strong upper-level low brought a subtropical and moisture-rich airmass that triggered numerous showers and thunderstorms. The strongest storms produced flash flooding at the burn scars in the Sierra Nevada, including the one due to the Ferguson Fire in Mariposa and Madera Counties and the Pier Fire burn scar in central Tulare County to the northeast of Porterville during that evening. Other storms produced heavy rain and localized street flooding in Visalia during that same evening.

November 27-28: An atmospheric river brought copious amounts of moisture to much of Central California. One to two inches of rain fell in the San Joaquin Valley, and even greater amounts fell in the Sierra Nevada foothills. Snow amounts ranged from several inches in Kern County at elevations above 6,000 feet to 2-3 feet in the Sierra Nevada, mainly above 7,000 feet.

Monthly Summaries

January

Air quality was poor throughout the San Joaquin Valley to begin the calendar year because of stagnant high pressure and haze mixed with some smoke. Except for a few days with storms, the month was mainly dry. A storm brought significant rainfall to the south end of the San Joaquin Valley (almost one inch in Bakersfield) during the 8th and 9th but was relatively warm so that little to no snow fell at elevations below 8,000 feet. Warmer than average temperatures prevailed in the Central California Interior with a few foggy mornings in some spots across the Central Valley.

February

Precipitation was below average across the region, while temperatures were generally above average. Quite a few foggy nights and mornings occurred in the San Joaquin Valley, especially during the first half of the month. There were a couple of periods when low temperatures were well below average during the latter part of the month, including freezing temperatures in the San Joaquin Valley, or from the 20th through the 25th. Near the end of the month, there were a couple of days with precipitation reported, although amounts were generally light. Snowpack was well below average for this month in the mountain areas, including the Sierra Nevada.

March

Precipitation was well above average for the month due to an active weather period throughout much of the month and was the wettest month for the wet season thus far. The most significant precipitation of the year so far occurred during the 20th through the 22nd. A weak tornado touched down about 8 miles to the north of Visalia on the afternoon of the 22nd. During that same afternoon, flash flooding brought significant impacts to Mariposa, including washing away of entire buildings, as well as flood impacts in nearby Sierra Nevada foothill communities. Unfortunately, the flooding caused three deaths in this area. Temperatures were quite mild due to

the persistent storm pattern for much of the month. In addition to the 20th-22nd, storms brought precipitation during the 2nd, 3rd, 10th, and the period from the 13th through the 16th.

April

There were some days with noteworthy precipitation - the 6th, 7th, and 16th. The most notable amounts occurred around Merced and in Yosemite Valley during the 6th and 7th. Merced received over an inch of rain, while Yosemite Valley had near three inches. Other nearby locations received around two to three inches with this storm. This rain was due to an atmospheric river of subtropical moisture that moved mainly over Merced County into Yosemite and some locations to the north. The warm nature of this storm allowed rapid snow melt to occur at elevations up to 8,000 feet, and the heavy rain combined with the snow melt to cause river flooding in Yosemite Valley that resulted in the closure of Yosemite National Park during and about a day prior to this period. The 16th was the last day many locations in the San Joaquin Valley would report measurable precipitation until October. It was otherwise a mild month in terms of temperature. Unfortunately, mountain snowpack ended below average for the wet season, as the active periods during this month and the previous one were not enough to make up for the precipitation deficit realized during the prior months.

May

No measurable rain fell this month in the San Joaquin Valley, except in a few locations near the end of the month (or just at the start of the Memorial Day holiday weekend). During the afternoon of the 25th and into the morning of the 26th, snow fell along the Sierra Nevada crest, although amounts were generally up to around one to two inches. Otherwise, showers and isolated thunderstorms developed to the north of Fresno, including at Merced. Rainfall amounts were generally light but reached around 0.25 to 0.50 inch where the heavier showers occurred. Temperatures were generally mild or slightly warmer than average for much of the month, except for a brief summer-like hot weather period near the end of the month.

June

Summer-like temperatures became more common, although there were quite a few mild periods at times due to onshore flow around low pressure systems over Northern California, such as during the 9th -10th and the 15th - 19th. As the low pressure systems move onshore, gusty winds occurred in quite a few Kern County desert and western San Joaquin Valley locations, especially through and just below the mountain passes. High temperatures in the Central Valley ranged from the upper 70s on the coolest days to over 100 degrees on the warmest days. Desert locations in Kern County remained warm on the milder days, or with highs mainly in the 90s, but became very windy at times. Very hot temperatures with highs near 110 degrees began around the 21st in the Kern County desert areas due to a strong ridge of high pressure. Overall, the warm temperatures and lack of precipitation were characteristics of a typical June.

July

This was a remarkably hot month due to a prolonged period of above average temperatures, and quite a few locations either reached near record high average temperatures or set new records for the month. Fresno started a 30 day stretch with daily maximum temperatures at or above 100 degrees on the 6th, and had a total of 28 days throughout the month when highs reached at least 100 degrees. In fact, Fresno had its warmest July on record, and even the warmest month on record. Bakersfield had a 25 day stretch of triple digit highs that started on the 11th and reached its second warmest July and month on record. The Ferguson Fire, or the large wildfire that was located in parts of Yosemite and the Sierra Nevada foothills to the northeast of Mariposa, produced smoke and very poor air quality throughout Central California during much of this month and a few weeks beyond into the following month. This wildfire spread rapidly and consumed tens of thousands of acres in a matter of a couple of days because of drought impacts, including extensive tree mortality and hot, dry conditions. Thunderstorms developed mainly along the Sierra Nevada crest and became strong enough at times to produce flash flooding in some of the remote areas. The desert regions in Kern County remained hot with daytime highs well into the triple digits throughout the entire month, although there were a few days with thunderstorms, especially on the 10th - 12th.

August

The streak of consecutive days with triple digit high temperatures ended on the 4th in Bakersfield and Fresno. Fresno's streak was 30 days long, while Bakersfield's lasted 25 days. Warm, dry weather continued until the middle of the month, but temperatures moderated soon after. The Ferguson wildfire was finally extinguished by the 22nd and consumed over 96,000 acres in the Sierra Nevada, including into Yosemite. Temperatures lowered to closer to average by around the 20th and continued for almost the remainder of the month. The month ended a little warmer than average, except for some areas of below average temperatures in western portions of the San Joaquin Valley due to pushes of marine air from the coast. Precipitation was below average, as there were few days with thunderstorms, including over the Sierra Nevada crest, with no reports of significant rain.

September

The month was warmer than average, but generally dry with a few exceptions. The entire month was dry in the San Joaquin Valley, as no rain was reported. Some periods with mild temperatures, or around 5-10 degrees below average, occurred during the middle part of the month and towards the end. Temperatures were even cooler during this period along the west side of the San Joaquin Valley in Fresno and Merced Counties due to proximity of marine air that filtered through the mountain passes. However, there was an exception in terms of precipitation - an active thunderstorm period occurred during the afternoon and evening of the 4th that brought heavy rain to the Sierra Nevada from Yosemite to Lake Isabella in Kern County. A few spots received around an inch of rain, including Lake Isabella. Wildfire activity was generally suppressed over the mountain areas, although many grass fires developed in the Central Valley and over the hilly terrain along the west side and towards the Grapevine.

October

A very active period occurred on the 2nd through the 4th, as numerous showers and thunderstorms developed in much of the Central California interior. On the 2nd, showers and thunderstorms formed mainly over the Sierra Nevada and dissipated due to loss of daytime heating. However, the 3rd was the most active day due to more coverage of thunderstorms, including outside of the Sierra Nevada. In the early morning hours of the 3rd, showers and thunderstorms formed over the Sierra and parts of the San Joaquin Valley, including in Fresno, as an upper-level disturbance moved northeastward into the Great Basin. This disturbance also brought sufficient instability over the Ferguson burn scar in the Sierra Nevada foothills and caused a road closure on Highway 140 to the west of Yosemite due to mudslides. The central low pressure system moved inland by the evening hours and brought locally heavy rain that fell in the San Joaquin Valley, such as in Visalia and Farmersville, as well as along the west side, including Avenal, Huron, and Coalinga. These locations experienced roadway flooding due to excessive rainfall in a very short period of time (about one inch per hour). In the early evening, thunderstorms with similar rain rates continued to develop and brought debris flows to the Pier Burn Scar, located in the Sierra to the west of Camp Nelson in Tulare County. Later in the evening on the 3rd, showers and thunderstorms continued to develop, although the storm activity shifted to mainly the south end of the Central Valley and towards the Grapevine as the low pressure system moved further inland during the overnight hours of the 3rd into the 4th. For the remainder of the month, high pressure was a dominating factor which allowed dry conditions and daytime high temperatures to reach as much as 10 degrees above average on some days, especially in the latter half of the month. Locations that did not report heavy rain due to thunderstorms earlier in the month received little or no rain for the entire month.

November

The month was generally quiet with warmer than average daytime high temperatures for the first 20 days. By the second week of the month, nights were quite cool, and low temperatures fell as low as the lower 30s in the San Joaquin Valley. The Kern County desert areas reported lows in the lower 20s on the morning of the 10th, as a very dry airmass moved into Central California. Gusty winds developed over the adjacent mountains, as well as over the Sierra Nevada and significantly lowered relative humidity for the next couple of days. Both daytime and nighttime humidity remained below 10 percent in quite a few mountain locations, especially in Kern County. Similarly warm daytime temperatures continued into much of the 3rd week of the month, and nights remained relatively cool. By the 21st, a series of several low pressure systems brought precipitation to the region, including rain and mountain snow. The month ended with near to slightly above average precipitation due to the weather active period that began on the 21st. The heaviest precipitation occurred with the storm that moved over Central California on the 27th and 28th. Over one inch of rain fell during this two day period in much of the San Joaquin Valley, and some locations, such as Merced received near two inches. The Sierra Nevada foothills reported three to five inches, and this was enough to cause mudslides and debris flows that were responsible for highway closures around the Ferguson Fire burn scar in parts of Mariposa and Madera Counties. On the last two days of the month dense fog developed in the Central Valley due to abundant moisture and relatively cool surface temperatures.

December

On the first day, a relatively weak storm system brought mainly light rain to the region. A stronger storm arrived on the 5th, although the heaviest amounts occurred in Kern County (or up to an inch in the mountains), as the upper-level low moved mainly over this region and into southern California. Otherwise, mainly light precipitation continued until the 6th. On the 7th and 8th, dense fog returned to the Central Valley as a weak ridge of high pressure passed over the area. Fog persisted into the afternoon hours in Merced and Chowchilla during the 8th as the ridge of high pressure was centered directly over this portion of Central California. Otherwise, patchy dense fog and low clouds persisted for the next several days over the Central Valley and the Sierra Nevada foothills. With the next storm on the 17th, generally light precipitation occurred in the San Joaquin Valley; however, precipitation amounts reached around one to three inches in the Sierra Nevada foothills and the Tehachapi Mountains. Afterward, two additional systems brought rain and mountain snow at times until Christmas Day. Precipitation was generally light to moderate with each system. Low clouds also caused fog problems over the Kern County mountain areas and Sierra Nevada foothills after the passage of both systems while patchy dense fog developed in the San Joaquin Valley where skies sufficiently cleared. For the remainder of the month after Christmas Day, temperatures lowered to much cooler than average with freezing temperatures in the San Joaquin Valley during the nights and mornings, while fog development was minimal. The month overall ended with above average temperatures and below to near average precipitation, although the highest precipitation amounts occurred over the Sierra Nevada and adjacent foothills from Mariposa to Fresno Counties.

Annual Temperature and Precipitation Rankings for 2018 at Bakersfield and Fresno:

Bakersfield – This calendar year tied with 2016 for the 3rd warmest calendar year on record; 49th lowest precipitation on record (since temperature and precipitation records began in 1893). The average temperatures over the last 5 consecutive years are also the top 5 warmest on record:

2014 – 69.5 deg
2017 – 68.5 deg
2018 – 68.2 deg
2016 – 68.2 deg
2015 – 68.0 deg

Fresno – This calendar year set the 2nd warmest calendar year on record; 56th lowest precipitation on record (Precipitation records began in 1881, while temperature records began in 1887). The average temperatures for the last 7 consecutive years are also the top 7 warmest on record:

2014 – 69.1 deg
2018 – 67.0 deg
2013 – 66.9 deg
2012 – 66.8 deg
2015 – 66.5 deg
2017 – 66.3 deg
2016 – 66.3 deg

Table 1: Annual Average Temperature and Total Precipitation vs. Departure from Average for NWS-owned ASOS sites in the NWS Hanford, CA Forecast Area

City	Monthly Average Temperature (nearest 0.1 deg)	Departure from Average (nearest 0.1 deg)	Total Precipitation (nearest 0.01 inch; T = trace amount)	Departure from Average (nearest 0.01 inch)	Percent of Average
Bakersfield	68.1	+2.9	5.18	-1.29	80.1
Fresno	66.9	+2.5	8.65	-2.85	75.2
Hanford	65.0	+2.2	6.16	-3.94	61.0
Madera	64.6	+2.4	9.80	-2.22	81.5
Merced	62.8	+0.3	9.95	-2.55	79.6

Figure 1: Departure from Average Temperature for 2018

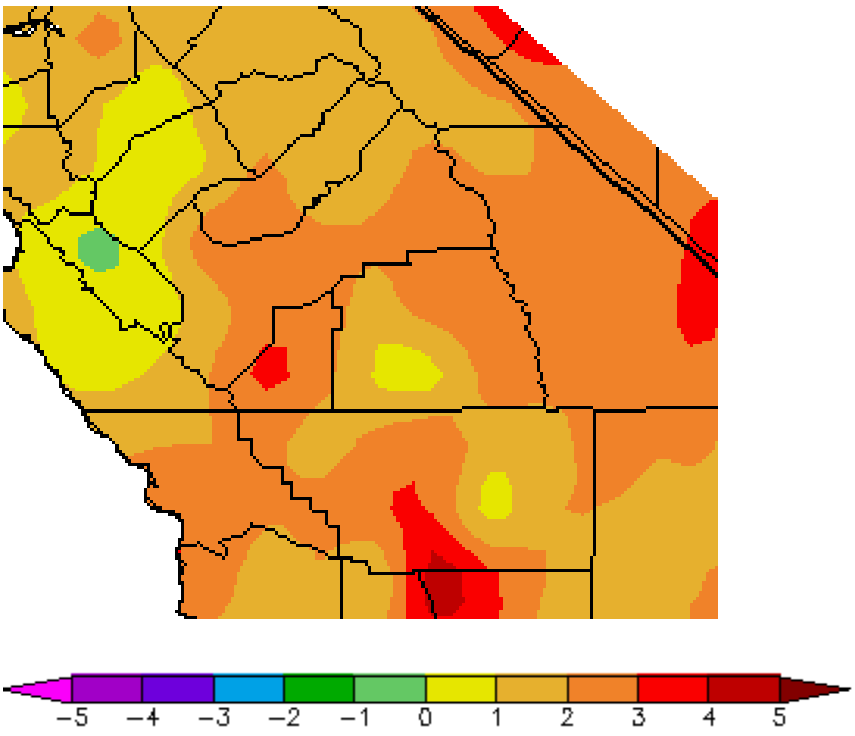
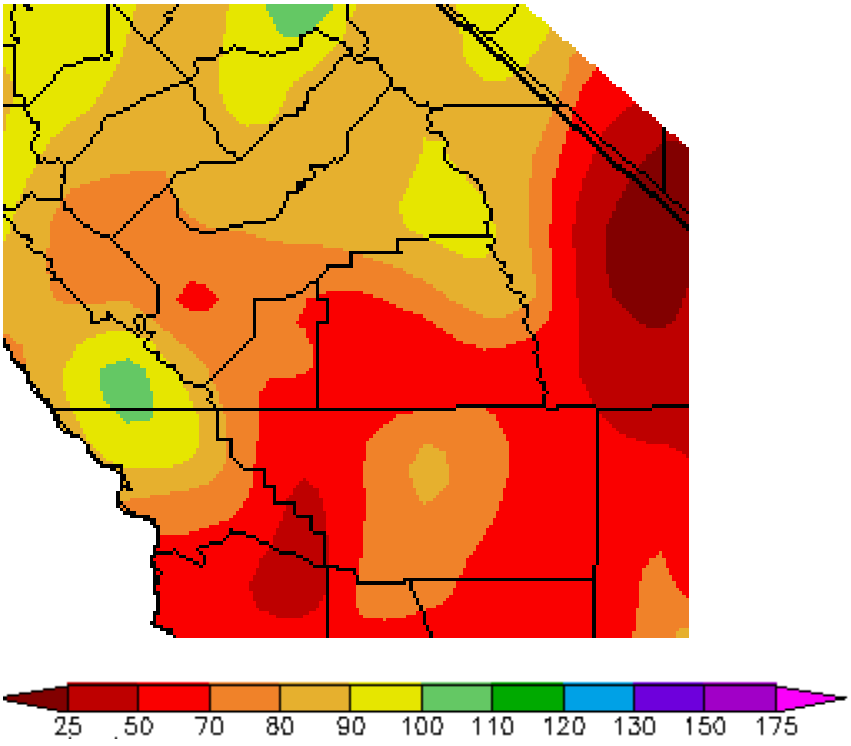


Figure 2: Percent of Average Precipitation for 2018



Images above (i.e., Figures 1-2) courtesy of Western Region Climate Center.